

## Abstract

The study aimed to examine how the evolution of technology and changed medical procedures, efficiency, and patient health over time. By surveying healthcare workers of various branches at Memorial Hermann Southwest (and other hospitals), this research captures data from individuals with on average 20 years of experience. Results from this survey showed that there is a strong agreement that technology has had a major positive impact in healthcare through non-invasive procedures and record-keeping ability. A even split of individuals were divided on opinions of change in efficiency over time, with some arguing it was the same while others believed it has also improved. This study highlighted the abilities of technology in healthcare and how artificial intelligence might play a role in the near future.

## Introduction/Summary

Throughout one's life, they go to a hospital or clinic several times. Whether they get a vaccine shot or have to go into surgery, these medical institutions are almost a necessity in the lives of humanity. In these places, a large variety of procedures are done technologically to be sure that every possible problem with a patient is accounted for. For example, Memorial Hermann Southwest Hospital in Sugar Land, TX has a Heart and Vascular institute where open heart surgeries are done. One of these surgeries, a Coronary Artery Bypass Graft (CABG), consists of 3 different technological procedures that ensure that both the surgery and recovery process go smoothly. Technology in medical procedures has drastically improved both efficiency and education on the matter [3]. However, this was not always the case. Back then, before technology began to take over as the primary support for medical procedures, people had to manually work to ensure survival. Operating rooms in the early 1900s consisted of solely a patient, the surgeons, and a bed. On top of this, surgeries were very invasive, dangerous, and painful then. Now, different kinds of technology are there to reduce the size of incisions and decrease time of recovery [2]. Diagnostic ability has also been increased by the use of technology [3]. Technology has improved the maintenance of medical records by a large margin. These effects are shown even outside of a medical setting. For example, even everyday actions related to healthcare have evolved through the use of technology. For example, the distribution of medicines or antibiotics across households around the world has increased through the help of technology [1]. Through looking at these changes, we can begin to understand the impact it has had on humanity and what could change in the future. This study is very widely considered and done worldwide. However, most research is very personalized to what the researcher views as an impact on healthcare. Although many other studies work at a more centralized viewpoint, not many stand out. This research serves the purpose of evaluating the extent in which the introduction and evolution of technology in medical science and studies has changed the productivity of procedures or medical-related activities. With this, it can be determined how these changes are bound to affect the world in the future, approaching concerns of both medical efficiency and the depletion of human work opportunities in healthcare. Going into this study, I believe that there will be a very large change in procedures across all parts, whether it is as small as checkups or as large as invasive surgeries.

## Methodology

This study will measure and record primarily the qualitative data. Memorial Hermann Southwest will serve as the main location where data will be recorded. In this location, I will ask doctors (preferably the ones that have been working in healthcare for a long time) about their opinions on changing healthcare and medical procedures. By considering age, I can ensure that the people sharing data are reliable and have a large span of knowledge on the matter. Questions will be given to these individuals through a survey. This survey will also be spread to many other hospitals in order to avoid potential biases towards Memorial Hermann Southwest or deviations that Memorial Hermann Southwest might have from general hospital regulations.

This survey will include...

- A brief explanation on the purpose of the survey
- A question on how long the individual has been working in healthcare.
- A question on which branch of healthcare the individual works in
- A rating how much medical procedures have changed over the years (1-5)
- A rating on how much technology has improved patient outcomes (1-5)
- A question of what has been the biggest impact on medical procedures
- A scale on how much they use procedures today that were uncommon when they started
- A comparison on the efficiency of medical procedures compared to when they started
- A question on the greatest change in healthcare they have observed
- A question on one change they expect in the next decade

## Discussion

Doing this study, I fully expected the results to be heavily skewed positively, as many would agree that technology has played a major part in the evolution of healthcare across multiple specialties. As expected, almost all of the respondents agreed that patient well-being and technology usage has improved a lot since they started working in healthcare. Although I liked the outcome of this research, there is always room for improvement. I believe, if I were to do this again, that I should try to get a more balanced group of individuals from many hospitals. In this research, majority of the respondents were from Memorial Hermann. I could always try to narrow my questioning down to one specific form of improvement to get more direct answers. I believe this research is presentable and would open many eyes to the impact of technology not only in healthcare, but in our world, as well as what to look forward to in the coming years.

## Results/Findings

Viewing these results, it came to no surprise that many believed that there has been major changes since they began working. The average amount of years working in healthcare was around 22.6, showing that majority of the respondents have enough experience to be dependable in their opinion, as they have seen the shift from manual approaches to healthcare to its technological replacement. Out of these respondents, there was a fairly equal share of branches in which they worked, with majority coming from cardiology or emergency care. This is explained by my availability in these departments, allowing me to get more respondents. Questions revolving the amount of change that medical procedures have advanced and the effect of technology on patient outcomes showed to be heavily skewed towards the upper ratings, with most respondents choosing 5. This was fairly expected, as statistics prove this to be overwhelmingly true. Once again, there wasn't much shock to seeing that majority of respondents believed that technology had the biggest impact in healthcare. Mostly all types of procedures have made the transition to technology in the past few decades. Most respondents said that they saw new procedures from when they started all the time, which correlates with the other responses regarding the advancement of procedures over time. What surprised me the most in this survey was a half of the respondents believed that procedures were just as efficient as before, while the other half believed it was more efficient. I expected this to be way more in favor of procedures being more efficient. For the open ended concerns, I picked the 3 most common responses and fit the outliers into one of the three that matched the most. It made sense to me that the transition to non-invasive procedures and technological advancements were the highest changes in healthcare. It also came to no surprise that most people believed AI would have the most impact on the future, followed by the transition to home based care.

## References

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